Scientists open new window into human learning—by studying maggots

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Fruit fly larvae is manipulated by a paint brush. Fruit flies have long served as models for studying behaviour because their cognitive mechanisms are parallel to humans', but much simpler to study. Credit: WHYISHNAVE SUTHAGAR

(Phys.org) —The squirming larva of the humble fruit fly, which shares a surprising amount of genetic material with the human being, is helping scientists to understand the way we learn information from one another.

Fruit flies have long served as models for studying behaviour because

their cognitive mechanisms are parallel to humans', but much simpler to study.

Fruit flies exhibit many of the same basic behaviours as humans and share 87 per cent of the material that is responsible for genetically based neurological disorders, making them a potent model for study.

While adult fruit flies have been studied for decades, the new paper reveals that their larvae, which are even simpler organisms, may be more valuable models for behavioural research. A fruit fly larva has only 3,000 neurons, for example, while a human has about 10 billion.

The McMaster researchers were able to prove that the larvae, or maggots, are capable of social learning, which opens the door to many other experiments that could provide valuable insights into human behaviour, end even lead to treatments for human disorders, the scientists say.

"People have been studying adult flies for decades now," explains the study's lead author, Zachary Durisko. "The larval stage is much simpler in terms of the brain, but behaviour at the larval stage has been less well studied. Here we have a complex behaviour in this even simpler model."

Durisko and Reuven Dukas, both of McMaster's Department of Psychology, Neuroscience and Behaviour, have shown that fruit fly larvae are able to distinguish which food sources have been used by other larvae and utilize the information to benefit themselves by choosing to eat from those same established sources instead of available alternatives.

The maggots' attraction to food that others have been eating is based on smell, and is roughly equivalent to a person arriving in a new city, seeing two restaurants and choosing a busy one over an empty one, the

researchers explain.

"They prefer the social over the non-social like we would do, and they learn to prefer the social over the non-social," Dukas says.

In fact, the motivations may be similar in each case, and could include accepting the judgment of others as an indication of quality and seeking the company of others for protection from harm.

Durisko, the lead author, recently completed his PhD at McMaster, and Dukas, his co-author, is a professor at the university. Their work is published in the prestigious *Proceedings of the Royal Society B*, one of the society's biological journals.

The researchers used several combinations of foods, both completely fresh and previously used, and of varying degrees of nutritional value, to compare the maggots' preferences.

More information: rspb.royalsocietypublishing.or … nt/280/1767/20131398

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